

WHAT IS CLAIMED IS:

1. A multicast authentication method for connecting a plurality of receiver hosts and a network of a sender host through a network interconnection apparatus and authenticating 5 participate of the sender host in one multicast group by an authentication server in the network, the method comprising:

10 a registration step of registering an address of each of the receiver hosts in the authentication server in accordance with an application for the participation in the one multicast group of the sender host from each of the receiver hosts; and
15 an authentication step of authenticating each of the receiver hosts based on a registration content of the authentication server in response to a participation request message from the receiver host.

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2. The multicast authentication method according to claim 1, further comprising an acceptance step of accepting each of the receiver hosts to participate in the one multicast group of the receiver host if the receiver host is authenticated 20 in response to the participation request message.

3. The multicast authentication method according to claim 2, wherein
25 in the acceptance step, when a multicast user registration is made in the registration step and it is determined in the authentication step that authentication fails, an entry of the multicast user registration is deleted in the

acceptance step.

4. The multicast authentication method according to claim 1, wherein

5 in the registration step, information on a port of said network interconnection apparatus to which the each receiver host or the relay unit is connected is registered together with the address of the receiver host or the relay unit in the authentication server.

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5. The multicast authentication method according to claim 1, wherein

in the registration step, a group address of the multicast group is further registered in the authentication server; and

15 in the authentication step, the each receiver host or the relay unit and the one multicast group are authenticated based on the registration content of the authentication server in response to the participation request message from the each receiver host.

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6. The multicast authentication method according to claim 5, wherein

in the registration step, a pair of the address of the each receiver host or the relay unit and the group address of the one multicast group are registered as one user name; and

25 in the authentication step, a transmitting end address

and the group address included in the participation request message are extracted, and the registration content of the authentication server is retrieved and the each receiver host or the relay unit is authenticated while setting a pair of 5 the transmitting end address and the group address as one user name.

7. The multicast authentication method according to claim 1, wherein

10 in the registration step, the address of the each receiver host or the relay unit is registered in the authentication server in response to an application for participation of the receiver host in all the multicast groups; and

15 in the acceptance step, if the each receiver host is authenticated in response to the participation request message, the receiver host is accepted to participate in all the multicast groups.

8. The multicast authentication method according to claim 20 1, wherein

in the registration step, accepted time for accepting the each receiver host to participate in the one multicast group is further registered in the authentication server; and

25 in the acceptance step, if the each receiver host is authenticated in response to the participation request message, the receiver host is accepted to participate in the one multicast group within the accepted time.

9. The multicast authentication method according to claim
8, wherein

in the acceptance step, the accepted time is preset for
each of the multicast groups, the accepted time is set for
5 each of the receiver hosts based on participation time for
participating in the one multicast group designated by the
each receiver host and the accepted time thus set is registered
in the authentication server when the participation application
is made.

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10. The multicast authentication method according to claim
8, wherein

in the acceptance step, the accepted time is preset for
each of the multicast groups, and the accepted time is registered
15 in the authentication server based on the one multicast group
designated by the each receiver host when the participation
application is made.

11. The multicast authentication method according to claim
20 8, wherein

the authentication step is executed by the authentication
server, and if the each receiver host is registered as a user
together with an authentication result, information on the
accepted time serving as the registration content is
25 transmitted to said network interconnection apparatus; and

the acceptance step is executed by said network
interconnection apparatus, said network interconnection

apparatus determines that the participation is accepted based on the authentication result received and accepts the participation of the each receiver host in the multicast group within the accepted time received.

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12. The multicast authentication method according to claim 8, wherein

the authentication step and the acceptance step are executed by said network interconnection apparatus, and the authentication server transmits a user registration content for the designated transmitting end address and the designated one multicast group to said network interconnection apparatus when the participation application is made; and

the network interconnection apparatus determines whether the each receiver host is authenticated based on the registration content, determines whether the participation of the each receiver host is accepted based on the authentication result and accepts the each receiver host to participate in the multicast address group within the accepted time.

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13. The multicast authentication method according to claim 8, wherein

in the authentication step, before the accepted time, it is determined the authentication as a failure.

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14. The multicast authentication method according to claim 1, wherein

in the multicast authentication method, the sender host is the Internet service provider, the service provider providing a content stream delivery service by a delivery server; and in the acceptance step, a content stream delivered from the delivery server within the accepted time is multicast-forwarded to the accepted receiver host.

10 15. The multicast authentication method according to claim 1, further comprising an accounting step of charging for an executed service.

15 16. A multicast authentication method for connecting a plurality of receiver hosts and a network of a sender host through a network interconnection apparatus and a relay unit, and authenticating participation of the sender host in one multicast group by an authentication server in the network, the method comprising:

20 a registration step of registering an address of the relay unit to which the each receiver host is connected in accordance with an application for the participation in the one multicast group of the sender host from each of the receiver hosts; and

25 an authentication step of authenticating the relay unit based on a registration content of the authentication server in response to a participation request message from the receiver

host.

17. The multicast authentication method according to claim
16, further comprising an acceptance step of accepting each
5 of the receiver hosts to participate in the one multicast group
of the receiver host if the receiver host is authenticated
in response to the participation request message.

18. The multicast authentication method according to claim
10 17, wherein

in the acceptance step, if a multicast user registration
is made in the registration step and it is determined in the
authentication step that authentication fails, an entry of
the multicast user registration is deleted in the acceptance
15 step.

19. The multicast authentication method according to claim
16, wherein

in the registration step, information on a port of said
20 network interconnection apparatus to which the each receiver
host or the relay unit is connected is registered together
with an address of the each receiver host or the address of
the relay unit in the authentication server.

25 20. The multicast authentication method according to claim
16, wherein

in the registration step, a group address of the multicast

group is further registered in the authentication server; and
in the authentication step, the each receiver host or
the relay unit and the one multicast group are authenticated
based on the registration content of the authentication server
5 in response to the participation request message from the each
receiver host.

21. The multicast authentication method according to claim
20, wherein

10 in the registration step, a pair of the address of the
each receiver host or the relay unit and the group address
of the one multicast group are registered as one user name;
and

15 in the authentication step, a transmitting end address
and the group address included in the participation request
message are extracted, and the registration content of the
authentication server is retrieved and the each receiver host
or the relay unit is authenticated while setting a pair of
the transmitting end address and the group address as one user
20 name.

22. The multicast authentication method according to claim
16, wherein

25 in the registration step, an address of the each receiver
host or the address of the relay unit is registered in the
authentication server in response to an application for
participation of the receiver host in all the multicast groups;

and

in the acceptance step, if the each receiver host is authenticated in response to the participation request message, the receiver host is accepted to participate in all the multicast groups.

23. The multicast authentication method according to claim 16, wherein

in the registration step, accepted time for accepting the each receiver host to participate in the one multicast group is further registered in the authentication server; and in the acceptance step, if the each receiver host is authenticated in response to the participation request message, the receiver host is accepted to participate in the one multicast group within the accepted time.

24. The multicast authentication method according to claim 23, wherein

in the acceptance step, the accepted time is preset for each of the multicast groups, the accepted time is set for each of the receiver hosts based on participation time for participating in the one multicast group designated by the each receiver host and the accepted time thus set is registered in the authentication server when the participation application is made.

25. The multicast authentication method according to claim
23, wherein

in the acceptance step, the accepted time is preset for
each of the multicast groups, and the accepted time is registered
5 in the authentication server based on the one multicast group
designated by the each receiver host when the participation
application is made.

26. The multicast authentication method according to claim

10 23, wherein

the authentication step is executed by the authentication
server, and if the each receiver host is registered as a user
together with an authentication result, information on the
accepted time serving as the registration content is
15 transmitted to said network interconnection apparatus; and

the acceptance step is executed by said network
interconnection apparatus, said network interconnection
apparatus determines that the participation is accepted based
on the authentication result received and accepts the
20 participation of the each receiver host in the multicast group
within the accepted time received.

27. The multicast authentication method according to claim
23, wherein

25 the authentication step and the acceptance step are
executed by said network interconnection apparatus, and the
authentication server transmits a user registration content

for the designated transmitting end address and the designated one multicast group to said network interconnection apparatus when the participation application is made; and

the network interconnection apparatus determines
5 whether the each receiver host is authenticated based on the registration content, determines whether the participation of the each receiver host is accepted based on the authentication result and accepts the each receiver host to participate in the multicast address group within the accepted time.

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28. The multicast authentication method according to claim
23, wherein

in the authentication step, before the accepted time,
it is determined the authentication as a failure.

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29. The multicast authentication method according to claim
16, wherein

in the multicast authentication method, the sender host
is the Internet service provider, the service provider
20 providing a content stream delivery service by a delivery
server; and in the acceptance step, a content stream delivered
from the delivery server within the accepted time is
multicast-forwarded to the accepted receiver host.

25 30. The multicast authentication method according to claim
16, further comprising an accounting step of charging for an
executed service.

31. An authentication server provided in a network of a sender host, comprising a registration unit which registers an address of a receiver host connected to a network of a sender host in accordance with a participation application for 5 participating in a multicast group of the sender host from the receiver host.

32. The authentication server according to claim 31, further comprising:

10 an authentication unit which determines whether the participation is authenticated based on a registration content of the registration unit in response to a participation request message from the receiver host; and
15 a transmission unit which transmits an authentication result of the authentication unit.

33. The authentication server according to claim 32, wherein the transmission unit transmits the registration content of the registration unit in response to the participation 20 request message from the receiver host.

34. The authentication server according to claim 31, wherein the registration unit registers, together with the address of the receiver host or an address of the relay unit, 25 information on a predetermined port to which the receiver host or the relay unit is connected.

35. The authentication server according to claim 31, wherein
the registration unit registers, together with the
address of the receiver host or an address of the relay unit,
a group address of the multicast group for which the
5 participation application is made.

36. The authentication server according to claim 35, wherein
the registration unit registers a pair of the address
of the receiver host or the address of the relay unit and the
10 group address of the multicast group as one user name; and
the authentication unit retrieves the registration content
of the registration unit and determines whether the receiver
host or the relay unit is authenticated while setting a pair
of a transmitting end address included in the participation
15 request message and the group address as one user name.

37. The authentication server according to claim 31, wherein
the registration unit further registers accepted time
for accepting the receiver host to participate in the multicast
20 group.

38. The authentication server according to claim 31, further
comprising a control unit which allows the accepted time to
be registered in the registration unit based on participation
25 time for participating in the multicast group designated by
the receiver host when the participation application is made.

39. The authentication server according to claim 31, further comprising a control unit which allows the accepted time to be registered in the registration unit based on the multicast group designated by the receiver host when the participation application is made.

40. An authentication server provided in a network of a sender host, comprising a registration unit which registers an address of a receiver host connected to a network of a sender host through a relay unit in accordance with a participation application for participating in a multicast group of the sender host from the receiver host.

41. The authentication server according to claim 40, further comprising:

an authentication unit which determines whether the participation is authenticated based on a registration content of the registration unit in response to a participation request message from the receiver host; and

a transmission unit which transmits an authentication result of the authentication unit.

42. The authentication server according to claim 41, wherein the transmission unit transmits the registration content of the registration unit in response to the participation request message from the receiver host.

43. The authentication server according to claim 40, wherein
the registration unit registers, together with an address
of the receiver host or the address of the relay unit, information
on a predetermined port to which the receiver host or the relay
unit is connected.

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44. The authentication server according to claim 40, wherein
the registration unit registers, together with an address
of the receiver host or the address of the relay unit, a group
10 address of the multicast group for which the participation
application is made.

45. The authentication server according to claim 44, wherein
the registration unit registers a pair of the address
15 of the receiver host or the address of the relay unit and the
group address of the multicast group as one user name; and
the authentication unit retrieves the registration content
of the registration unit and determines whether the receiver
host or the relay unit is authenticated while setting a pair
20 of a transmitting end address included in the participation
request message and the group address as one user name.

46. The authentication server according to claim 40, wherein
the registration unit further registers accepted time
25 for accepting the receiver host to participate in the multicast
group.

47. The authentication server according to claim 40, further comprising a control unit which allows the accepted time to be registered in the registration unit based on participation time for participating in the multicast group designated by 5 the receiver host when the participation application is made.

48. The authentication server according to claim 40, further comprising a control unit which allows the accepted time to be registered in the registration unit based on the multicast 10 group designated by the receiver host when the participation application is made.

49. A network interconnection apparatus connected to a plurality of receiver hosts and connected to an authentication 15 server through a network of a sender host, comprising:

20 a transmission processing unit which extracts a transmitting end address of a participation request message received from each of the receiver hosts, creates a message inquiring about authentication information, and conducts a transmission processing for transmitting the created message to the authentication server; and

25 an acceptance unit which accepts participation of the each receiver host in the multicast group based on an authentication result message received from the authentication server.

50. The network interconnection apparatus according to claim
49, wherein

5 said network interconnection apparatus further
comprises a management table for managing receivers of the
multicast group; and

10 the transmission processing unit determines whether an
entry of the extracted transmitting end address exists in the
management table, and for transmitting the message inquiring
about the authentication information based on a determination
result.

51. The network interconnection apparatus according to claim
50, wherein

15 the acceptance unit deletes the corresponding entry
registered in the management table if the authentication result
of the authentication server shows that authentication fails.

52. The network interconnection apparatus according to claim
49, wherein

20 the transmission processing unit extracts a group address
as well as the transmitting end address of the received
participation request message, creates the message inquiring
about the authentication information, and conducts the
transmission processing for transmitting the created message
25 to the authentication server.

53. The network interconnection apparatus according to claim
49, wherein

the acceptance unit accepts participation of the each
receiver host in the multicast group within accepted time based
5 on the authentication result message received from the
authentication server.

54. The network interconnection apparatus according to claim
53, wherein

10 the acceptance unit deletes the corresponding entry
registered in the management table if the authentication result
of the authentication server shows that authentication fails.

55. The network interconnection apparatus according to claim
15 54, wherein

the sender host is the Internet service provider, the
service provider comprising a delivery server delivering a
content stream, the delivery server provided in the network;
and the acceptance unit of said network interconnection
20 apparatus multicast-forwards a packet of the content stream
delivered from the delivery server to the accepted each receiver
host within the accepted time.

56. The network interconnection apparatus according to claim
25 49, wherein

the sender host is the Internet service provider, the
service provider comprising a delivery server delivering a

content stream, the delivery server provided in the network; and the acceptance unit of said network interconnection apparatus multicast-forwards a packet of the content stream delivered from the delivery server to the accepted each receiver host.

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57. The network interconnection apparatus according to claim 56, wherein

the sender host is the Internet service provider, the service provider comprising the delivery server delivering the content stream, the delivery server provided in the network; and the acceptance unit of said network interconnection apparatus multicast-forwards the packet of the content stream delivered from the delivery server to the accepted each receiver host within the accepted time.

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58. A multicast authentication system comprising: a plurality of receiver hosts; a network of a sender host; a network interconnection apparatus for connecting the plurality of receiver hosts to the network; and an authentication server provided in the network, wherein

the authentication server, provided in the network of the sender host, comprises a registration unit which registers an address of one of the receiver hosts connected to the network of the sender host in accordance with a participation application for participating in a multicast group of the sender host from the receiver host;

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said network interconnection apparatus, connected to
 the plurality of receiver hosts and connected to the
 authentication server through the network of the sender host,
 comprises a transmission processing unit which extracts a
5 transmitting end address of a participation request message
 received from the one receiver host, creates a message inquiring
 about authentication information, and conducts a transmission
 processing for transmitting the created message to the
 authentication server; and an acceptance unit which accepts
10 participation of the one receiver host in the multicast group
 based on an authentication result message received from the
 authentication server; and

the authentication server authenticates the
 participation of the one receiver host in the multicast group
15 of the sender host, and said network interconnection apparatus
 accepts the receiver host to participate in the multicast group.

59. The multicast authentication system according to claim
58, further comprising:

20 a relay unit connected between the network
 interconnection apparatus and the plurality of receiver hosts,
 the relay unit changing the transmitting end address of the
 participation request message transmitted from the one receiver
 host to an address of the relay unit itself and relaying the
25 changed address to said network interconnection apparatus,
 the relay unit changing a destination address a packet
 transmitted from said network interconnection apparatus, the

destination address being the address of the relay unit itself, to the address of the one receiver host issuing the participation request and relaying the changed address to the one receiver host.

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60. The multicast authentication system according to claim 58, wherein the multicast authentication system further comprises a delivery server provided in the network and delivering a content stream, and multicast-forwards a packet 10 of the content stream delivered from the delivery server to the accepted one receiver host.

61. The multicast authentication system according to claim 60, wherein the multicast authentication system 15 multicast-forwards the packet of the content stream delivered from the delivery server to the accepted one receiver host within accepted time.

62. The multicast authentication system according to claim 20 58, wherein

the multicast authentication system further comprises an accounting server provided in the network and charging for an executed service; and

said network interconnection apparatus detects a 25 multicast stream, and transmits detection data to said accounting server.